



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/500,209

06/28/2004

Takayuki Suzuki

500.43947X00

2529

7590

05/28/2009

Antonelli Terry  
Stout & Kraus  
Suite 1800  
1300 North Seventeenth Street  
Arlington, VA 22209

EXAMINER

RADEMAKER, CLAIRE L

ART UNIT

PAPER NUMBER

1795

MAIL DATE

DELIVERY MODE

05/28/2009

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/500,209	<b>Applicant(s)</b> SUZUKI ET AL.	
	<b>Examiner</b> CLAIRE L. RADEMAKER	<b>Art Unit</b> 1795	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 25 March 2009.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-6,8,10-12,14 and 16-23 is/are pending in the application.
- 4a) Of the above claim(s) 1-6 and 16-22 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 8,10-12, 14, and 23 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 June 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                       | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>3/25/2009</u> .   | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on March 25, 2009 has been entered.

### ***Election/Restrictions***

2. Newly submitted claim 22 and amended claims 1-6 & 16-21 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: the claimed separator could be made by a materially different method such as a method which does not require the specific compression molding & superposing steps of the claimed method.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 1-6 & 16-22 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Claims 7, 9 13 & 15 are cancelled. Claims 8, 10-12, & 23 are pending and are rejected for reasons of record.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 8, 10-12, 14, & 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pellegrini et al. (US 4,197,178) in view of Tashiro et al. (JP 2000-100453).

With regard to claims 8, 10-12, & 23, Pellegrini et al. teaches a fuel cell (col. 1, lines 9-11 & col. 2, lines 50-51; Figure 1) comprising a separator (3, col. 5, line 18; Figure 1), wherein the separator is a molded body (col. 2, lines 60-68 & col. 3, lines 7-8) comprising graphite and a thermosetting resin in a graphite:resin ratio of 50wt%:50wt% to 90wt%:10wt% (col. 2, lines 50-54 & 65-68); wherein the separator has a rib portion (14, col. 5, lines 39-44; Figure 1) a flat portion (Figure 1), and openings within the flat portion (15 / 16 / 18 / 19, col. 5, lines 39-44 & col. 6, lines 39-40 & 45; Figures 1 & 3), but fails to teach the use of pulverized expanded graphite powder .

Tashiro et al. teaches a fuel cell (paragraphs [0001], [0006] & [0032], claim 5; Figure 2) comprising a separator (1, paragraphs [0006] & [0032]), wherein the separator

Art Unit: 1795

comprises expanded graphite, which is a pulverized powder made from an expanded graphite sheet, (paragraphs [0007] & [0002]) and a thermosetting resin (paragraphs [0006] & [0018]), where said expanded graphite can be washed to remove impurities such as sulfate ions (paragraphs [0011]-[0012]) in order to create a separator with improved machine hardness and electrical properties (paragraph [0017]).

It would have been obvious to one of ordinary skill in the art at the time of the invention to replace the graphite of Pellegrini et al. with the expanded graphite of Tashiro et al. in order to create a separator with improved machine hardness and electrical properties (paragraph [0017]).

While modified Pellegrini et al. fails to specifically state that the separator will behave the same as the separator of the instant application when soaked in water for the disclosed amount of time at the disclosed temperature, one of ordinary skill in the art would understand that the separator of modified Pellegrini et al. would behave the same as the separator of the instant application, due to the specified composition and method of making the separator.

Furthermore, it is noted that the product-by-limitations of claim 8 is not given patentable weight since the courts have held that patentability is based on a product itself, even if the prior art product is made by a different process (MPEP 2113). Moreover, a product-by-process limitation is held to be obvious if the product is similar to a prior art product (MPEP 2113). Claim 8 as written does not distinguish the product of the instant application from the product of the prior art.

With regard to claim 14, Pellegrini et al. teaches a fuel cell (col. 1, lines 9-11 & col. 2, lines 50-51; Figure 1) comprising the separator of claim 8 (see above).

The limitation "formed by the method according to any one of claims 4 and 6" of claim 14 is not given patentable weight due to election by original presentation and claims 4 & 6 being withdrawn due to election by original presentation.

## **Response to Arguments**

### **Claim Rejections - 35 USC §102 & §103**

5. Applicant's arguments with respect to claims 1-6, 8, 10-12, 14, & 16-23, filed on March 25, 2009, have been considered but are not persuasive.

On pages 7-8, 12, & 14 -16 of the Applicant's Response, Applicants argue that "the separator has the property or characteristic that after soaking the separator at 80°C for 100 hours in 30 times the volume of the molded body of water, total concentration of sodium, potassium, iron, nickel and magnesium released into the soaking water is 20ppm or less, and concentration of sulfur released into the soaking water is 30ppm or less" (Applicant's Response, pages 7-8).

The Examiner respectfully disagrees with the Applicants argument that "the separator has the property or characteristic that after soaking the separator at 80°C for 100 hours in 30 times the volume of the molded body of water, total concentration of sodium, potassium, iron, nickel and magnesium released into the soaking water is

Art Unit: 1795

20ppm or less, and concentration of sulfur released into the soaking water is 30ppm or less” (Applicant's Response, pages 7-8) because while modified Pellegrini et al. fails to specifically state that the separator will behave the same as the separator of the instant application when soaked in water for the disclosed amount of time at the disclosed temperature, one of ordinary skill in the art would understand that the separator of modified Pellegrini et al. would behave the same as the separator of the instant application, due to the specified composition (pulverized expanded graphite and thermosetting resin) and method of making (compression molding) the separator.

Furthermore, the Examiner maintains that the limitation “after soaking the separator at 80°C for 100 hours in 30 times the volume of the molded body of water...” is a product-by-process limitation and that the product-by-limitations of claim 8 is not given patentable weight since the courts have held that patentability is based on a product itself, even if the prior art product is made by a different process (MPEP 2113). Moreover, a product-by-process limitation is held to be obvious if the product is similar to a prior art product (MPEP 2113). Claim 8 as written does not distinguish the product of the instant application from the product of the prior art.

On pages 8 & 10 of the Applicant's Response, Applicants argue that “The evidence in Applicants' specification, discussed *infra*, shows such unexpectedly better results” (Applicant's Response, page 8).

The Examiner respectfully disagrees with the Applicants argument that the Applicant's invention as claimed produces unexpected results (Applicant's Response, page 8) because no evidence has been provided to support this argument. Examples 1-4 & Comparative Examples 1-2 (Specification, page 44, Table 1) are not truly comparable because multiple variables are simultaneously varied (eg: average particle size of pulverized powder of expanded graphite and the weight ratio of pulverized powder of expanded graphite to phenolic resin), thereby failing to show how the average particle size of pulverized powder of expanded graphite and how the weight ratio of pulverized powder of expanded graphite to phenolic resin specifically relate to single cell voltage. For example, when comparing Example 2 to Comparative Example 1, the examples both have the same average particle size of pulverized powder of expanded graphite, but have different weight ratios of pulverized powder of expanded graphite to phenolic resin.

Similarly, Examples 5-7 & Comparative Examples 3-5 (Specification, page 55, Table 2) are not truly comparable because multiple variables are simultaneously varied (eg: operation time and average voltage), thereby failing to show how change in stirring time after addition of water in the process of preparing acid treated graphite, the use of a stainless steel vat in the process of expanding acid treated graphite, or the omission of a post-curing treatment after molding specifically relate to concentrations of metal impurities and sulfur content that leached into water upon said separators being soaked. For example, when comparing Example 5 to Comparative Example 3, the examples both have the same average particle size of pulverized powder of expanded graphite



Art Unit: 1795

and have the same weight ratios of pulverized powder of expanded graphite to phenolic resin, but have different operation times and average voltages, in addition to a change in the stirring time after addition of water in the process of preparing acid treated graphite.

On page 8 of the Applicant's Response, Applicants argue that "the teachings of the applied references would have neither disclosed nor would have suggested such separator as in the present claims, having features as discussed previously in connection with claim /, and having additional features as in the claims dependent thereon, including wherein the graphite is expanded graphite (note claim 10); and/or wherein the graphite is a pulverized powder of an expanded graphite sheet (see claim 11); and/or where the resin is a thermosetting resin (see claim 12)" (Applicant's Response, page 8).

The Examiner respectfully disagrees with the Applicants argument that "the teachings of the applied references would have neither disclosed nor would have suggested such separator as in the present claims, having features as discussed previously in connection with claim /, and having additional features as in the claims dependent thereon, including wherein the graphite is expanded graphite (note claim 10); and/or wherein the graphite is a pulverized powder of an expanded graphite sheet (see claim 11); and/or where the resin is a thermosetting resin (see claim 12)" (Applicant's Response, page 8) because Pellegrini et al. teaches a fuel cell separator comprising

Art Unit: 1795

graphite and a thermosetting resin (col. 2, lines 50-54 & 65-68) and because Tashiro et al. teaches that it is advantageous to have a fuel cell separator comprise expanded graphite, which is a pulverized powder made from an expanded graphite sheet, where said separator also comprises a thermosetting resin, in order to create a separator with improved machine hardness and electrical properties (paragraphs [0015] & [0017]).

On pages 9 & 13 of the Applicant's Response, Applicants argue that "the applied references would have neither disclosed nor would have suggested such a method for manufacturing a separator for a fuel cell as in the present claims" (Applicant's Response, page 9).

In response to the Applicants argument that "the applied references would have neither disclosed nor would have suggested such a method for manufacturing a separator for a fuel cell as in the present claims" (Applicant's Response, page 9), the Examiner notes that newly submitted claim 22 and amended claims 1-6 & 16-21 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: the claimed separator could be made by a materially different method such as a method which does not require the specific compression molding & superposing steps of the claimed method.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 1-6 & 16-22 are withdrawn from

Art Unit: 1795

consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

On page 11 of the Applicant's Response, Applicants argue that "Applicants have found that the bending strain at the flat portion at break, rather than bending strength, is an important parameter" (Applicant's Response, page 11).

In response to the Applicant's Response that "Applicants have found that the bending strain at the flat portion at break, rather than bending strength, is an important parameter" (Applicant's Response, page 11), the Examiner notes that all claims containing the limitation "bending strain" have been withdrawn due to election by original presentation, as discussed above.

Furthermore, the Examiner respectfully disagrees with the Applicants argument that the properties such as bending strain, compressive modulus, and Shore hardness are not inherent to a separators composition and the method of making said separator (Applicant's Response, page 15) because one of ordinary skill in the art would understand that properties such as bending strain, compressive modulus, and Shore hardness are dependent upon an objects composition (pulverized expanded graphite and thermosetting resin) and the method of making (compression molding) said object.

On page 14 of the Applicant's Response, Applicants argue that Tashiro et al. teaches that "the concentration of the expansive graphite grains is limited to 500ppm or

Art Unit: 1795

below” (Applicant's Response, page 14) and that Tashiro et al. “either alone or in combination with the teachings of Pellegrini, et al., would have neither disclosed nor would have suggested such separator as in the present claims, wherein the separator (as contrasted to the expansive graphite grains in Tashiro, et al.) has a concentration of sulfur released into the soaking water under specified conditions, of 30ppm or less, and advantages achieved thereby” (Applicant's Response, page 14).

The Examiner respectfully disagrees with the Applicants argument that Tashiro et al. teaches that “the concentration of the expansive graphite grains is limited to 500ppm or below” (Applicant's Response, page 14) and that Tashiro et al. “either alone or in combination with the teachings of Pellegrini, et al., would have neither disclosed nor would have suggested such separator as in the present claims, wherein the separator (as contrasted to the expansive graphite grains in Tashiro, et al.) has a concentration of sulfur released into the soaking water under specified conditions, of 30ppm or less, and advantages achieved thereby” (Applicant's Response, page 14) because while modified Pellegrini et al. fails to specifically state that the separator will behave the same as the separator of the instant application when soaked in water for the disclosed amount of time at the disclosed temperature, one of ordinary skill in the art would understand that the separator of modified Pellegrini et al. would behave the same as the separator of the instant application, due to the specified composition (pulverized expanded graphite and thermosetting resin) and method of making (compression molding) the separator.

Art Unit: 1795

Furthermore, the Examiner maintains that the limitation “after soaking the separator at 80°C for 100 hours in 30 times the volume of the molded body of water...” is a product-by-process limitation and that the product-by-limitations of claim 8 is not given patentable weight since the courts have held that patentability is based on a product itself, even if the prior art product is made by a different process (MPEP 2113). Moreover, a product-by-process limitation is held to be obvious if the product is similar to a prior art product (MPEP 2113). Claim 8 as written does not distinguish the product of the instant application from the product of the prior art.

### ***Conclusion***

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to CLAIRE L. RADEMAKER whose telephone number is (571)272-9809. The examiner can normally be reached on Monday - Friday, 8:00AM - 4:30PM, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on 571-272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1795

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Mark Ruthkosky/  
Primary Examiner, Art Unit 1795

/C. L. R./  
Examiner, Art Unit 1795